What is Claimed:

1. A method of preparing antigen-nanoparticle conjugates, comprising:

providing a nanoparticle; and

conjugating a plurality of carbohydrate antigens to the nanoparticle, wherein the carbohydrate antigens are specifically expressible on a tumor cell surface.

2. The method of claim 1, wherein a plurality of nanoparticles are provided, and a plurality of carbohydrate antigens are conjugated to at least a portion of the nanoparticles.

3. The method of claim 2, wherein a plurality of carbohydrate antigens are conjugated to each of the nanoparticles.

4. The method of claim 1, wherein the carbohydrate antigens comprise a linking group, and the linking group is conjugated to the nanoparticle.

5. The method of claim 4, wherein the linking group includes at least one sulfur atom, carboxylate group, amide group, carbamate group, carbonate group, thiocarbamate group, thiocarbonate group, thioether group, succinamide group, n-hydroxy succinamide group, or any combination thereof.

6. The method of claim 1, wherein conjugating includes self-assembly of the carbohydrate antigens on at least one surface of the nanoparticle.

7. The method of claim 1, wherein the nanoparticle comprises one or more nanoparticle linking groups, and the carbohydrate antigens are conjugated to the nanoparticle linking groups.

8. The method of claim 1, wherein one or more spacer groups link the carbohydrate antigens to the nanoparticle.

9. The method of claim 8, wherein the one or more spacer groups include PEG, a carbon chain, a carbon chain including sulfur, nitrogen or oxygen in the backbone, polymers including polyacrylamide, a peptide chain made up of all glycine or alanine units, or any combination thereof.

10. The method of claim 1, further comprising purifying the nanoparticles.

11. The method of claim 10, wherein said purifying includes filtration, centrifugation, electrophoresis, chromatography, crystallization, or any combination thereof.

12. An antigen-nanoparticle conjugate comprising a plurality of carbohydrate antigens conjugated to a nanoparticle, wherein the antigens are specifically expressible on a tumor cell surface.

13. The antigen-nanoparticle conjugate of claim 12, wherein the plurality of carbohydrate antigens are identical to each other.

14. The antigen-nanoparticle conjugate of claim 12, wherein the carbohydrate antigens include TF antigen, T_n antigen, Gb1 antigen, GM_1 antigen, GM_3 antigen, Lewis Y Antigen, or any combination thereof.

15. The antigen-nanoparticle conjugate of claim 12, wherein at least a portion of the carbohydrate antigens are displayed to the immune system in human carcinomas during tumor growth and progression.

16. The antigen-nanoparticle conjugate of claim 12, wherein the carbohydrate antigens are capable of inducing galectin-3 surface expression in endothelial cells.

17. The antigen-nanoparticle conjugate of claim 14, wherein the carbohydrate antigens include at least one different carbohydrate antigen in addition to TF-Antigen.

18. The antigen-nanoparticle conjugate of claim 12, wherein at least one of the plurality of tumor–associated carbohydrate antigens is conjugated to a spacer group, and the spacer group is conjugated to the nanoparticle.

19. The antigen-nanoparticle conjugate of claim of 18, wherein the spacer group includes PEG, a carbon chain, a carbon chain including sulfur, nitrogen or oxygen in the backbone, a polymer, a peptide, or any combination thereof.

20. The antigen-nanoparticle conjugate of claim 12, wherein one or more carbohydrate antigens are conjugated to one or more linking groups, and the linking groups are conjugated to the nanoparticle.

21. The antigen-nanoparticle conjugate of claim 20, wherein the linking groups include at least one sulfur atom, carboxylate group, amide group, carbamate group, carbonate group, thiocarbamate group, thiocarbonate group, thioether group, succinamide group, n-hydroxy succinamide group, or any combination thereof.

22. The antigen-nanoparticle conjugate of claim 12, wherein one or more carbohydrate antigens are conjugated to one or more spacer groups, the spacer groups are conjugated to one or more linking groups, and the one or more linking groups are conjugated to the nanoparticle.

23. The antigen-nanoparticle conjugate of claim 22, wherein the linking groups include at least one sulfur atom, carboxylate group, amide group, carbamate group, carbonate group, thiocarbamate group, thiocarbonate group, thioether group, succinamide group, n-hydroxy succinamide group, or any combination thereof.

24. The antigen-nanoparticle conjugate of claim 12, wherein each of the carbohydrate antigens are covalently linked to one or more sulfur atoms.

25. The antigen-nanoparticle conjugate of claim 12, wherein the carbohydrate antigens are each linked, individually, to one or more sulfur atoms.

26. The antigen-nanoparticle conjugate of claim 12, wherein each of the carbohydrate antigens include one or more amino acids.

27. The antigen-nanoparticle conjugate of claim 24, wherein at least two sulfur atoms are covalently linked to each other.

28. The antigen-nanoparticle conjugate of claim 24, wherein at least one of the sulfur atoms is bonded to the nanoparticle.

29. The antigen-nanoparticle conjugate of claim 28, wherein the bonds between the sulfur atoms and the nanoparticle include covalent bonds, hydrogen bonds, ionic bonds, van der Waals bonds, or any combination thereof.

30. The antigen-nanoparticle conjugate of claim 12, wherein the carbohydrate antigens include a disaccharide.

31. The antigen-nanoparticle conjugate of claim 30, wherein the disaccharide comprises at least one amino sugar group.

32. The antigen-nanoparticle conjugate of claim 12, wherein at least one of the plurality of the carbohydrate antigens is a prognostic indicator for cancer, a marker of metastasized carcinoma cells, an adhesion molecule involved in metastasis, or any combination thereof.

33. The antigen-nanoparticle conjugate of claim 12, wherein the nanoparticle includes gold atoms, silver atoms, platinum atoms, rhodium atoms, palladium atoms, or any combination thereof.

34. The antigen-nanoparticle conjugate of claim 33, wherein the nanoparticle is derived from colloidal gold.

35. The antigen-nanoparticle conjugate of claim 12, wherein the antigen-nanoparticle conjugate has a molecular weight in the range of from about 1,000 Daltons to about 1 million Daltons.

36. The antigen-nanoparticle conjugate of claim 12, wherein the number of carbohydrate antigens conjugated to the nanoparticle is in the range of from about 2 to about 1000.

37. The antigen-nanoparticle conjugate of claim 12, wherein the nanoparticle has from about 50 to about 10,000 atoms.

38. The antigen-nanoparticle conjugate of claim 12, wherein the nanoparticle has a dimension in the range of from about 0.5 nm to about 100 nm.

39. The antigen-nanoparticle conjugate of claim 38, wherein the nanoparticle has a dimension in the range of from about 1 nm to about 10 nm.

40. The antigen-nanoparticle conjugate of claim 38, wherein the nanoparticle has a spheroidal shape, and the diameter of the nanoparticle is in the range of from about 1 nm to about 10 nm.

41. The antigen-nanoparticle conjugate of claim 38, wherein the nanoparticle has a icosahedral, cubic, rhombic, hexagonal, or fullerene shape.

42. A method for inhibiting metastasis of carcinoma cells in a mammal, comprising:

administering to a mammal or cells thereof a therapeutically effective amount of the antigen-nanoparticle conjugate of claim 12.

43. A method for inhibiting metastasis of carcinoma cells in a mammal, comprising:

administering to a mammal or cells thereof a therapeutically effective amount of antigen-nanoparticle conjugates comprising a plurality of carbohydrate antigens conjugated to a plurality of nanoparticles, wherein the carbohydrate antigens are specifically expressible on a tumor cell surface.

44. The method of claim 43, wherein the mammal is a human.

45. The method of claim 44, wherein the human is diagnosed as having cancer.

46. The method of claim 45, wherein the cancer is breast cancer.

47. The method of claim 46, wherein metastasis to lung cells is inhibited.

48. The method of claim 43, further comprising removing tumor cells from said mammal.

49. The method of claim 48, wherein the tumor cells are removed from said mammal prior to administering the therapeutically effective amount of the antigen-nanoparticle conjugates.

50. The method of claim 43, wherein the carbohydrate antigens are displayed to the immune system in human carcinomas during tumor growth and progression.

51. The method of claim 43, wherein the carbohydrate antigens include TF-Antigen, T_n-Antigen, Gb1 Antigen, GM1 Antigen, GM3 Antigen, Lewis Y Antigen, or any combination thereof.

52. The method of claim 43, wherein the carbohydrate antigens are capable of inducing galectin-3 surface expression in endothelial cells.

53. The method of claim 51, wherein the carbohydrate antigens include TF-Antigen.

54. The method of claim 43, wherein the carbohydrate antigens are conjugated to an exterior surface of said nanoparticle.

55. The method of claim 43, wherein at least one of the tumor–associated carbohydrate antigens is conjugated, individually, to at least one spacer group, and the at least one spacer group is conjugated to the nanoparticle.

56. The method of claim of 55, wherein the spacer group includes PEG, a carbon chain, a carbon chain including sulfur, nitrogen or oxygen in the backbone, a polymer, a peptide, or any combination thereof.

57. The method of claim 43, wherein one or more carbohydrate antigens are conjugated to a linking group.

58. The method of claim 43, wherein one or more carbohydrate antigens are conjugated, individually to a spacer group, and one or more spacer groups conjugated to a linking group.

59. The method of claim 58, wherein the linking group include at least one sulfur atom, carboxylate group, amide group, carbamate group, carbonate group, thiocarbamate group, thiocarbonate group, thioether group, succinamide group, n-hydroxy succinamide group, or any combination thereof.

60. The method of claim 43, wherein each of the carbohydrate antigens is covalently linked to one or more sulfur atoms.

61. The method of claim 60, wherein at least two of the sulfur atoms are bonded to each other.

62. The method of claim 60, wherein the carbohydrate antigens are each linked, individually, to one or more sulfur atoms.

63. The method of claim 60, wherein at least one of the sulfur atoms is bonded to at least one of the plurality of nanoparticles using $NaBH_4$.

64. The method of claim 63, wherein the bonds between the sulfur atoms and the nanoparticle are characterized as being covalent bonds, ionic bonds, hydrogen bonds, van der Waals bonds, or any combination thereof.

65. The method of claim 43, wherein the carbohydrate antigens comprises a disaccharide.

66. The method of claim 65, wherein the disaccharide comprises at least one amino sugar group.

67. The method of claim 43, wherein the carbohydrate antigens is a prognostic indicator, a marker of metastasized carcinoma cells, an adhesion molecule involved in metastasis, or any combination thereof.

68. The method of claim 43, wherein at least one of the plurality of the nanoparticles includes gold atoms, silver atoms, platinum atoms, rhodium atoms, palladium atoms, or any combination thereof.

69. The method of claim 68, wherein the nanoparticles include colloidal gold particles.

70. The method of claim 12, wherein the molecular weights of at least a portion of the antigen-nanoparticle conjugates is in the range of from about 1,000 Daltons to about 1 million Daltons.

71. The method of claim 70, wherein the molecular weights of at least a portion of the antigen-nanoparticle conjugates is in the range of from about 10,000 Daltons to about 500,000 Daltons.

72. The method of claim 43, wherein at least a portion of the antigen nanoparticle conjugates comprise, individually, from 2 to about 1000 carbohydrate antigens.

73. The method of claim 43, wherein at least a portion of the nanoparticles comprise from about 50 to about 10,000 atoms.

74. The method of claim 43, wherein at least a portion of the nanoparticles has a dimension in the range of from about 0.5 nm to about 100 nm.

75. The method of claim 74, wherein at least a portion of the nanoparticles has a dimension in the range of from about 1 nm to about 10 nm.

76. The method of claim 74, wherein at least a portion of the nanoparticles comprises a spheroid shape, and the dimension is the diameter of the nanoparticle.

77. The method of claim 1, wherein the carbohydrate antigens include a plurality of antigens selected from one or more of antigen Classes A2, A3, A4, A5, B2, and B3 of Table 1.

78. The antigen-nanoparticle conjugate of claim 12, wherein the carbohydrate antigens include a plurality of antigens selected from one or more of antigen Classes A2, A3, A4, A5, B2, and B3 of Table 1.

79. The method of claim 43, wherein the carbohydrate antigens include a plurality of antigens selected from one or more of antigen Classes A2, A3, A4, A5, B2, and B3 of Table 1.